DOCUMENT RESUME

ED 161 688 SE 025 063

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TITLE Maximizing Information from Implementation of Innovative Courses.
PUB DATE Apr 78
NOTE 9p.; Paper Presented at the Annual Meeting of the International Council of Associations for Science Education (Nijmegen, The Netherlands, April 1978); Contains occasional light type

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Achievement; *Curriculum Development; *Curriculum Evaluation; *Educational Assessment; Elementary Secondary Education; *Information Dissemination; *Innovation; Program Evaluation; Science Education

ABSTRACT

Discussed are four different approaches to the evaluation of the implementation of innovative courses. The first approach is that of Alkin and his associates at UCLA. This group emphasized the need to collect information on the degree to which an innovative course is implemented for the purpose of taking corrective action to achieve full installation before performance data are collected. The second approach is associated with the work of Stallings, who limited the evaluation to classrooms in which the key elements of an innovation actually had been implemented by classroom teachers. The third approach emerged from the work of Hall and Loucks. It suggests eight levels of use of an implementation. The fourth approach is the approach suggested by the author to maximize the information from experimental implementation of innovative courses. It requires completion of eleven steps. Assumptions, disadvantages and advantages of this approach are also discussed. (HM)

Maximizing Information From Implementation of Innovative Courses[1]

David Churchman[2]

Researchers and evaluators have increasingly come to realize that many findings that innovative courses developed during the sixties are no better and no worse than traditional ones may reflect failure to insure implementation of the innovative courses before achievement is measured. One consequence has been attention by researchers to the problems associated with the implementation of innovations. Among evaluators at least three different approaches to the problem have emerged.

The earliest of the three stems from the systems-oriented evaluators such as those at UCLA when Alkin was the director of the Center for the Study of Evaluation. This group emphasized the need to collect information on the degree to which an innovative course is implemented for the purpose of taking corrective action to achieve full installation before performance data is collected. Although it is acknowledged that modification of the original plan may be required, this approach makes the unlikely assumption that ultimately it will be possible to achieve uniform implementation regardless of the number and types of teachers involved, and it requires repetition of the innovation until satisfactory implementation has been achieved.

A second approach is perhaps most closely associated with Research for Better Schools, and particularly with the work of Stallings, who required curriculum developers to specify key elements of an innovation, then limited the evaluation to classrooms in which the key elements actually had been implemented by classroom teachers. Thus, the possibility that the achievement measured was not a consequence of the innovation was minimized. But, the method requires training and supplying a large number of teachers with the expectation of using data from only a small number, and it requires yes-no decisions concerning the presence or absence of an innovation. The method would become extremely expensive and cumbersome as the number of key elements in an innovative course increases.

A third approach is emerging from the work of Hall and Loucks at the Texas Research and Development Center, where the notion of measuring the relationship between student achievement and eight "levels of use" of an implementation is being developed. This approach seems the most promising of the three; but the suggested scales are general and abstract, and thus unlikely to adapt easily and usefully to particular programs. Further, the approach does not provide information for the three major purposes for which it is useful to collect implementation information.

1) Paper presented at the annual meeting of the International Council of Associations for Science Education, Nijmegen, The Netherlands, April 1978.

2) Science Education Directorate, National Science Foundation, Washington, DC.

The first of these purposes, of greatest interest to school administrators, and the one which the UCLA group had in mind, is to provide information that will enable administrators to take whatever corrective action is necessary to more fully implement the innovative course. The second of these purposes, probably of greatest interest to parents and taxpayers, is to provide accurate measurements of what an innovative program can help students to achieve. The third purpose, of greatest interest to curriculum developers, is to develop a fund of generalizable knowledge useful to the development of future innovative courses.

The assumptions, strengths and weaknesses of the three approaches discussed above suggest an approach to implementation evaluation designed to meet all three purposes and thus to maximize the information from experimental implementation of innovative courses. This approach requires completion of the steps discussed below.

1. Identify K key elements of the innovation. While any educational program includes a large number of elements, the number that make it innovative and that distinguish it from other programs will be relatively small. The initial step in the approach being suggested is to require identification of these key elements.

2. Determine a scale and method for measuring each key element. The choice between nominal, ordinal, interval and ratio scales, and between such methods for determining the extent to which the key element is present as observation, interviews or questionnaires should be made based on characteristics of each key element.

3. Identify L levels of implementation of each of the K elements. One might consider the eight levels proposed by Hall and Loucks, or some other number, but it probably is necessary only to determine the scores on each scale required to distinguish high, moderate and low implementation of the evaluation, or similar fairly gross categories.

4. Determine the number of teachers to be involved in the trial. Assume that each teacher will choose to implement each of the K elements at one of the L levels independently of one another. Identify the element with the largest number of levels of implementation and multiply this by the minimum number of teachers (probably 5) that you assume as necessary for statistical purposes in each cell.

5. Select a setting in which to implement the innovative course. The main requirement is a single educational administrative unit with a sufficient number of teachers of the required type. Other requirements including willingness to participate will also have to be met but need not concern us here.

6. Train teachers to implement the evaluation: The importance of involving teachers in the planning and implementation of any innovative course has emerged from research in this area. Thus, one should expect each individual teacher to make unpredictable decisions as to how the innovation will be adapted in each classroom. However, and this is the key point, this approach permits, expects and even encourages each teacher to make a fully independent decision on the level at which each element of the innovation, and particularly the key elements, will be implemented. Teachers should, however, be required

to record their intention with respect to implementation of the K elements, in terms of the scale for each (step 2) or the more gross categories (step 3).

7. Implement the innovative course. Select appropriate points at which the implementation of each of the K elements will be measured, using the scales designed in step 2. Where teachers have been unable to reach the target levels they set for their own classrooms, administrators should be ready to provide additional resources to reach these levels as quickly as possible. For this purpose, a contingency fund must have been budgeted from the beginning.

8. Measure the achievement of each child. Use a criterion-referenced measurement technique appropriate to the innovative course, collecting data from all classes in which each participating teacher installed the innovation to any degree.

9. Analyze data to determine the contribution to achievement made by each key element. The data on degree of implementation of each key element of the innovative course can be analyzed through such methods as multiple correlations and multiple regression using achievement scores as the dependent variable to obtain estimates of the effect of each key element on student achievement.

10. Conduct secondary analyses. Additional analyses of the data may be conducted to explore possible differences in the importance of each key element for students differing on such grounds as socioeconomic status, ethnicity or academic track. The intent to conduct these analyses must be determined in advance, as they must be taken into account when selecting the setting in which the innovation will be implemented or during measurement of student achievement.

11. Interpret results of the experimental implementation of the innovative course. Write the implementation evaluation report interpreting the probable relative contribution of each key element to achievement of each type of student.

The approach advocated above involves at least two important assumptions:

1. That teachers will choose different levels at which they will implement the various elements of an innovative course.
2. That teachers will choose implementation levels independently of one another.

The approach advocated has at least two important disadvantages:

1. It requires a fairly substantial pilot effort--probably a minimum of 40 teachers and, therefore, in the U.S. about 500 elementary schools or a larger number of secondary students.
2. It is complex, technical and still little more than an idea and therefore results almost inevitably will be difficult to interpret and ambiguous.

Compensating for these disadvantages are some very important advantages:

1. More often than not the minimum number of teachers suggested above will also be the maximum number required.

2. The expectation of different levels of implementation eliminates the need for a control group, and thus for many difficulties associated with this type of research, including randomization, the assumption that treatment and control groups have the same educational objectives and controlling contamination of treatment and control groups while maintaining equivalency along such dimensions as socio-economic status.

3. It is more realistic to take advantage of natural variation among teachers than to use a model that requires all teachers to implement complex programs in the same way.

4. Useful data is obtained regardless of the degree to which the innovative course is implemented by each teacher.

5. Estimates can be made mathematically of the effects of different degrees of implementation of the innovative course. This can be done for specific types of students if proper care is taken in designing the pilot implementation.

6. There is no need to continually repeat the pilot implementation to obtain needed information.

7. Information can be obtained that meets the needs of a variety of audiences who might be interested in various aspects of the innovation.

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